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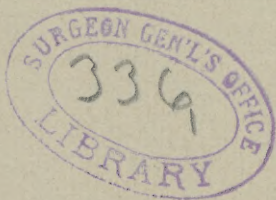
BY

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ON CYSTOSCOPY,
AND THE NEW CYSTOSCOPE OF NITZE AND LEITER.
*WITH A DEMONSTRATION OF THE SAME.**

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NEW YORK.

MR. CHAIRMAN AND GENTLEMEN: The two new cystoscopes of Dr. Max Nitze and Mr. Josef Leiter are the improved forms of an instrument known to the medical world since the year 1879. It was formerly called the Bruck-Nitze-Leiter or Nitze-Leiter cystoscope.

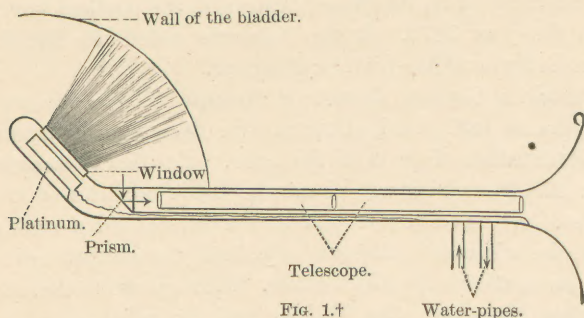
Bruck, a German dentist of Breslau, Silesia, was the first who, in 1857, used platinum wire heated to whiteness for illumination of parts of the body. He tried to accomplish this by making use of the diaphanic qualities of the tissues. To examine the bladder he introduced a strong light, the white-hot platinum wire, into the rectum and a tube *per urethram* into the bladder. Through the latter tube he then inspected the bladder and its adjacent parts. Twenty years later Dr. Max Nitze proposed to introduce the white-hot platinum wire directly into the cavity or canal to be examined. He designed and constructed various instruments with which he intended to inspect more

* Read before the Section in Surgery of the New York Academy of Medicine, April 9, 1888.

closely the urethra, bladder, stomach, etc., the two latter organs through a telescope situated in a central cavity forming the axis of the instrument.

But these instruments were very defective yet. They were improved and made available for general use by the patience and perseverance of Leiter, a well-known instrument-maker of Vienna, after many months of expensive and troublesome experiments. On the 9th of May, 1879, the cysto-urethroscope was presented to the Society of Physicians of Vienna by Dr. Nitze.*

There is no doubt that Dr. Nitze is the inventor of the urethro-cystoscope, and that the medical profession is indebted to him for his continuous efforts, extending over more than twelve years, to improve the instruments. But at the same time we must appreciate the ingenious work of Mr. Leiter. He also deserves that his name be for ever connected with these electric endoscopes.



The cystoscope (Fig. 1), then, consists of a silver tube of the shape of a catheter, in the short beak of which a

* "Wiener med. Wochenschrift," 1879, No. 24, and "Wiener med. Presse," 1879, No. 26.

† Instead of the wire loop at the end of the instrument there should be a straight wire.

platinum wire is fastened. The latter is made incandescent by means of an electric current which passes through it, and then darts its rays upon the wall of the bladder through an oval window in the concavity of the beak, covered with transparent quartz. To convey the current of electricity to the platinum an insulated wire runs through the whole length of the shank; the metal of the tube forms the connection with the opposite pole. The platinum wire is surrounded by a combination of pipes through which a current of cold water runs, to keep the heated instrument perfectly cool. They measure only one millimetre and a half in diameter and pass through the whole length of the sound, entering at its collar. According to Nitze's design, a telescope is introduced into the shank of the cystoscope, as above mentioned. It enlarges and magnifies the spot coming into sight. Without this telescope we should not see much more at the time than a spot of about the size of a pea; with it we are enabled to inspect a portion as large as a silver dollar, and even more.

At the junction of beak and shank corresponding to the concave side a rectangular prism is cemented in, the hypotenuse-plane of which acts as a mirror on account of the total reflection of the rays. Thus a diminished, inverted real picture arises in the shank of that wall of the bladder which is situated at a right angle to the longitudinal axis of the instrument and opposite the prism. It is again inverted by means of the lenses of the telescope and thrown to the outer end of it, where the examining person looks at the now upright picture through the magnifying ocular of the telescope. At the middle of the upper circumference of the funnel-shaped handle a small knob is soldered. It enables us to be permanently informed to which side the beak points.

If the fundus of the bladder is to be inspected with this

instrument it must be turned 180° and its handle deeply depressed between the thighs of the patient, the latter being

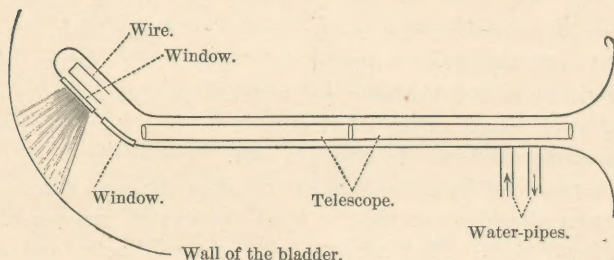


FIG. 2.

in the recumbent (lithotomy) position, the best for examination with the cystoscope. This manipulation may sometimes be very painful. To avoid this, a second instrument (Fig. 2) is made with the window for the incandescent platinum on the convex side of the beak. There is another window at the end of the straight tube through which the observer looks with the telescope. Of course there is no prism.

In using the original cystoscope there were needed, besides a Bunsen's battery with a special fluid, a rheostat, to give the current with the greatest subtileness of the necessary strength in each case, and a reservoir containing about two or three gallons of cold water. These accessory apparatuses complicated the instrument very much and made it very expensive, in consequence of which cystoscopy was very rarely resorted to. The new instrument was only bought by some larger clinical institutions and hospitals and used by a few specialists and surgeons who take interest in investigation of diseases of the bladder, such as Nitze, v. Dittel, Nicoladoni, Ultzmann, Sir Henry Thompson, and the late Dr. Maas, professor of surgery in the university of

Würzburg, Bavaria. They all unanimously and repeatedly praised the excellent results of inspecting the bladder.

The enormous advance in electro-technique made in the last few years also improved the cystoscope. Edison's lamps of a very small caliber, so-called mignon-lamps, well known to you all, took the place of the platinum wire and did away with the many accessory apparatuses, especially with the water-pipes. The new cystoscope is very handy and not expensive.

That the two men who invented and constructed the original instrument are at variance in regard to the priority of the improvements may be immaterial to us. We derive from the controversy—that even found its way into Dr. Nitze's newest and lucid essay, "*Beiträge zur Endoskopie der männlichen Harnblase*"*—two cystoscopes, made in accordance with the same principle and varying only in some trifles. It seems that both are equally good and useful and of the same price (\$18 without duty). Leiter's cystoscope shows the old pattern with the improvements mentioned.

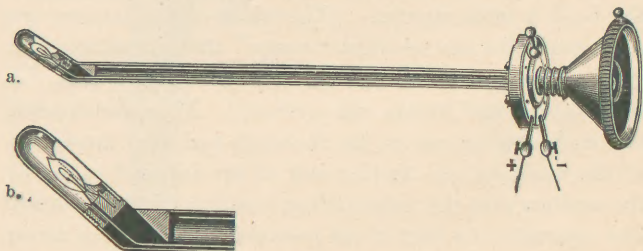


FIG. 3.

A key near the handle can be made to break or make the current by turning it to the right or left upon or from an

* Langenbeck's "*Archiv für klinische Chirurgie*," vol. xxxvi, 3, p. 661.

ivory plate. The shank of the instrument is somewhat short; its telescope diminishes the part in view a trifle. Why it does not show it in its normal size I do not know. Nitze puts the mignon-lamp into the end of the beak and does not protect it with transparent quartz. He says that it is not necessary, and he is thus enabled to use lamps of a larger

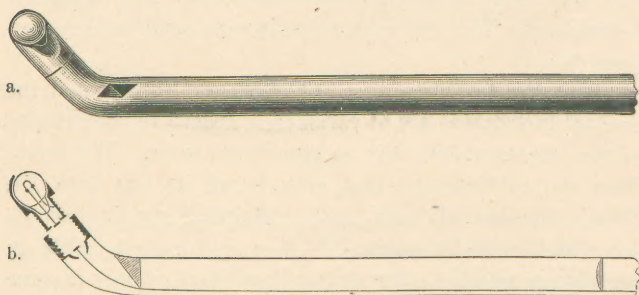


FIG. 4.

size and therefore a brighter light. His telescope magnifies. The shank is an inch longer than that of Leiter's instrument, the beak a trifle shorter. (The wires of the battery are connected with the so-called "tongs" that are attached to two isolated metal rings at the collar of the instrument. A slide makes and breaks the current.) Nitze constructed two more cystoscopes for the thorough and easy inspection of the fundus of the bladder and of the internal orifice of the urethra with the surrounding portions of the bladder, and especially of a part of the prostate. In these the prism is situated in the beak of the sound close to the mignon-lamp. In the first (the cystoscope for the fundus), the lamp and prism face the convex side of the beak; in the second (for the internal orifice of the urethra), the concave side. The picture arising, after having passed a system of two strong convex lenses in the beak, is reflected from a mirror

fastened at the curvature of the instrument. Another lens in the middle of the shank throws the picture to the outer

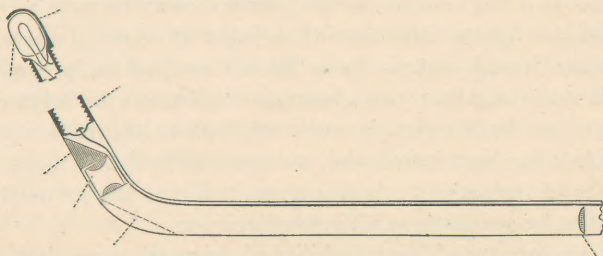


FIG. 5.

end, where the examining person again looks at it through the magnifying ocular. Both certainly are very important instruments.

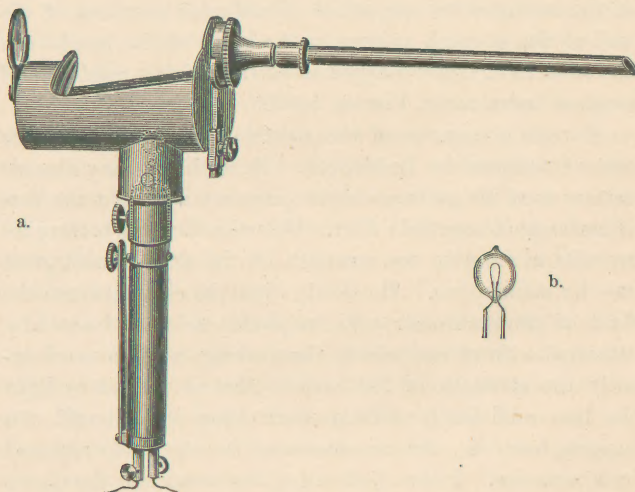


FIG. 6.

On account of the differences named, Nitze alleges superiority for his cystoscope. Nevertheless, I first sent for Lei-

ter's, because he makes use of the mignon-lamps also for urethroscopy in a very practical manner. To be sure, a kerosene-lamp with one or a few burners or a gas-lamp gives sufficient light to illuminate the urethra by means of a head-mirror through Grünfeld's or Klotz's urethral endoscopes; but it is undoubtedly an advantage to have an even brighter light in a handle that is easily attached to the endoscope after it has been introduced, and can readily follow the motions of the patient. It also seems that it is just as handy as the former patterns after some practice.

On account of the possibility of using the same electroscope, only with different head-pieces, for rhinoscopy, laryngoscopy, œsophagoscopy, otoscopy, etc., v. Dittel called it "pan-electroscope." I shall also demonstrate it hereafter. A thorough description of these instruments—also of the new gastroscope, which illuminates portions of the wall of the stomach as large as the palm of the hand—can be found in J. Leiter's separate edition of his catalogue of surgical instruments, Vienna, 1887.

For the generation of the electric current I ordered the battery designed by Leiter, too. Nevertheless, any electric battery used for galvano-caustic purposes will light the bow of carbonized vegetable fiber. But with Leiter's battery we are able to regulate the strength of the current with great ease by millimetres. He slowly dips the elements into the fluid of pure chromic acid, sulphuric acid, and water by means of a screw and winch, thus taking care to reach exactly the strength of the current that is needed to light the bow sufficiently without destroying it. Should this happen, however, the mignon-lamp is very easily replaced by a new one. I have been using the same and first lamp for the last ten weeks. It is worth mentioning that the six small elements can be converted without trouble into one very powerful, and then be used for galvano-caustic pur-

poses. P. Hartwig, an instrument-maker of Berlin, who makes Nitze's cystoscope, sells an electric battery constructed exactly after the same principle.

I received Nitze's cystoscope and the battery only this afternoon, and so can not say much more about the battery at present. But, according to information I got from Dr. Nitze a few days ago, it seems to work well likewise.

In using the cystoscope we put its beak into a glass or bowl under water (the above-mentioned key touching the metal of course), and then slowly turn the winch until the lamp gives a constant and bright light. Then we break the current by bringing the key in contact with the ivory plate, dip the instrument into glycerin (vaseline would dim the window and prism), and introduce it into the bladder. This manipulation is just as easily performed as the introduction of a simple catheter. Before we apply the instrument, the bladder must be washed, provided the urine is bloody or cloudy with mucus, and then be partially distended with from five to six ounces of clear water. If the urine is quite clear, no preliminary washing is necessary. The water cools the heated beak without getting warmer itself. As soon as we feel, after the introduction, that the beak moves freely in the bladder, we light the lamp again by simply turning the key to the left, and are now able to inspect the bladder in perfect daylight.

The advance, Mr. Chairman, that will result from this simpler and more convenient cystoscope for the diagnosis and treatment of diseases of the bladder is great and easy to see. There is no doubt that cystoscopy, this new method of ocular inspection of the interior surface of the bladder, "has as great importance for the diagnosis of diseases of the bladder as laryngoscopy has for those of the larynx" (Nitze).

I should here like to say that I had studied this chapter carefully and with great interest for many months, when

Nitze's treatise, mentioned above, the best and most complete we have on cystoscopy in literature, was published. It is rather difficult now to bring out anything new on this subject. Nitze leaves hardly anything unsaid that could be thought of only in regard to the future progress in diagnosis and treatment with the help of the cystoscope. I follow him in some of my further explanations.

Before giving you a summary of this advance, I must mention the conditions that have to be fulfilled if the endoscopical examination of the bladder is to be successfully made. I just said "advance." I should better say "*future advance*" that will be surely made in the diagnosis of obscure diseases of the bladder with the help of the cystoscope, and that not only by the specialist, but by the general practitioner also.

There are three conditions:

1. The caliber of the urethra must be sufficiently large to allow of the passing of the cystoscope (No. 23 French).

2. There must be sufficient capacity of the bladder. Nitze usually injects five ounces, a quantity that can be retained in nearly every instance. To get an easier view of the upper region he adds some air. The bubbles can be seen very distinctly with the cystoscope.

3. We must be able to have a transparent fluid in the bladder, at least during the time of examination. It is important to know, however, that the water does not need to be perfectly clear. The view we get when the water is a little muddy is still quite satisfactory. In cases of hæmaturia originating in the bladder, it will be advisable to postpone the examination until the flow of blood has ceased.

Then, also, I should like to tell you, Mr. Chairman and gentlemen, what is to be seen in the healthy bladder before we inspect the morbid one. Of course, the picture is more

monotonous than, for instance, that of the larynx, but it is very interesting nevertheless.

The normal mucous membrane of the bladder mostly has a pale, yellowish-red coloring in bright illumination, more rarely a pink one. If the prism is brought near enough, we perceive in it fine ramifications of small blood-vessels, similar to those that we see on the retina with the ophthalmoscope. Furthermore, there come into view irregular projections (the innermost layer of the detrusor muscles) between flat, but sometimes very deep, holes. The latter ones are "acquired diverticula," which are found, according to Nitze, much oftener than is usually believed. The other class of diverticula—the congenital ones—will be seen when the mucous membrane has its normal smoothness and only shows slight elevations. At last the orifices of the ureters are conspicuous. In most cases they can be seen with great ease. I myself have been able to see them very plainly in all the cases I have thus far examined. They appear as long, slit-formed notches in the middle of an oblong protuberance, or as small, round holes. In watching more closely the orifice of either of the ureters for some time, I have easily been able to see how the urine entered the bladder at intervals of from thirty to sixty seconds. I have been enabled to do so by the whirls which the urine—viz., a solution of salts—produced in the water that had been injected into the bladder. We can see the same arise at any time when we pour urine into a test-tube filled with water. On the same occasion I observed quite an interesting physiological phenomenon, which is not mentioned, as far as I have seen, in any one of our hand-books on physiology. You all know that the urine enters the bladder at intervals with a rush, and so much so that it forms a real little fountain when the bladder is filled with air, or opened by incision. The urine is pressed forward,

first, by the *vis a tergo* ; second, by the difference in pressure between the pelvis of the kidney and the cavity of the bladder ; and, third, by the peristaltic contractions of the ureteric muscles. Now, as there are in the wall of the ureter more muscular fibers running longitudinally than transversely,* the orifice of the ureter, and with it the elevation of the mucous membrane in which it ends, is drawn *inward* at the end of each conveyance of urine into the bladder, the orifice and its nearest adjacent parts then taking the shape of a funnel. After a few seconds it returns to its former position. That this occurs each time and is a physiological phenomenon I have fully convinced myself in two cases.

Now, what is the advance in the knowledge of the different diseases of the bladder which cystoscopy has accomplished, in addition to what we learn by the examination of the urine and of the interior of the bladder by means of sounds and the combined rectal palpation ?

First, we are able to decide with absolute certainty whether the bladder is healthy or morbid.

Every one of you, gentlemen, who has been unable to make out in a certain case of urinary trouble the location of the disease, after a very careful chemical and microscopical analysis of the urine, and exhausting all the older methods of examination, will appreciate the great value of such a surety.

“The negative result is here fully equivalent to the positive one.” For, if it is proved that the seat of the disease is *not* in the bladder, then it must be looked for somewhere else, especially in the upper urinary passages, most probably in the kidneys.

The importance of this fact—namely, to be able to decide whether the bladder is healthy or morbid—for a diag-

* Ranke, “Grundzüge d. Physiol.,” 1875, p. 496.

nosis *per exclusionem* is evident. Only a few days ago I had an interesting experience in that respect. A young man, twenty-five years of age, was sent to me by a colleague for cystoscopy on account of an obscure trouble of his urinary system. The patient had had gonorrhœa twice, the last time fifteen months ago. It was complicated with catarrh of the neck of the bladder. Lately he had been treated with local applications, made with the help of the endoscope; but he never was relieved. For about seven months there had been a constant painful feeling of pressure in the region of the bladder, sometimes retention for a whole day, sudden stop in the flow of urine, and no relief when the bladder was emptied. Now and then the last few drops were mixed with blood. No symptoms of catarrh, no tenesmus. The urine contained a trace of albumin. Specific gravity, 1.016. The patient was a good deal emaciated, unable to work, and depressed. The early history revealed that he had masturbated more or less for many years when he was a boy.

On inspecting the cavity of the bladder with the cystoscope, I could only detect a very dense network of enlarged small blood-vessels, "a marked hyperæmia" of the trigonum Lieutaudii; everything else was in a perfectly normal condition.

Whether this hyperæmia, undoubtedly a continuation of the catarrh of the neck of the bladder, is the cause of all trouble, I don't venture to decide. Perhaps it is. If so, one or more instillations of a few drops of a five- or ten-per cent. solution of nitrate of silver into the trigonum and neck of the bladder should bring some change for the better. Should this not happen, the symptoms must be looked at as dependent upon a nervous origin, either reflex spasm of the sphincter or paresis of the detrusor muscle. Certainly the formerly obscure disease, and the way of its treat-

ment, has thus been materially cleared up by the cystoscopic examination.

Can we prove now with the cystoscope which kidney is diseased? It seems that we may perhaps be able to do this in future, when we have sufficiently learned to see and to manipulate inside of the bladder after the cystoscope has been introduced. Either we could attempt, according to Nitze, to push a very thin catheter (introduced alongside the cystoscope into the bladder), under the guide of our eyes, into one of the orifices of the ureters—provided they have been found at all—and draw the urine directly from the kidney, or we might be able to observe out of which ureter the blood escaped, for instance, in a case of hæmaturia. Many a time the blood has been seen flowing from an injured papilla of a tumor of the bladder that was examined with the cystoscope.

Looking over the well-known diseases of the bladder, we shall be able, first of all in *catarrh*, to make a strict differential diagnosis between the different forms—acute, chronic, hæmorrhagic, diphtheritic—and probably learn to diagnose *in the picture* those differing in ætiological respects, especially the tuberculous one. It will be very easy to see ulcerations. Diverticula are very exactly demonstrated. Even in 1883 Sir Henry Thompson maintained that their presence could not be proved *in vivo* in the majority of cases.

Foreign bodies not to be detected by the sound, even in the hands of a well-experienced surgeon, may not only be seen, but localized.

A very interesting case of this kind was published by Nicoladoni* two years ago. Most of you have read it in the journals. In a lad eighteen years of age, who had introduced a medium-sized pin, head forward, into his urethra nine days before, he saw, by means of the old-shaped

* "Wiener med. Wochenschr.," 1886, 7, 8.

cystoscope, the pin fixed in the right part of the anterior wall close to the vertex after he had tried in vain to detect it with the probe. The pin cast a shadow on the opposite wall of the bladder. In the same year v. Dittel * saw a piece of sealing-wax, covered with salts, in the bladder.

In 1884 Fillenbaum † found in the bladder of a fifty-four year-old tabetic patient, who catheterized himself, the broken piece of a Nélaton catheter with the cystoscope. Grünfeld's endoscope, that was tried first, gave a negative result.

Last year Nitze ‡ diagnosticated in the wall of the bladder of a woman a silk ligature, and removed it with the help of his cystoscope. Martin, of Berlin, had performed ovariectomy on her a short time before, and ligated the pedicle and vessels with silk. Some of the ligatures caused an intraperitoneal abscess that perforated into the bladder.

It seems almost unnecessary to mention that we can plainly see stones in the bladder, make out their size, shape, and mobility, and percuss them with the beak of the cystoscope by the guidance of our eyes. (Those gentlemen who take interest in the matter may try this afterward on the phantom.) Cystoscopy is of special importance for the diagnosis of encysted stones.

Allow me, Mr. Chairman, to give here the short history of a case of stone in the bladder that recently occurred in my private practice, and had passed through the hands of a number of doctors of this city. It shows the predominant place we must accord to cystoscopy in the diagnosis of obscure diseases of the urinary system: L. T., aged twenty-three years. First gonorrhœic infection two years ago; second, last year. Complications with prostatitis, catarrh of the neck,

* "Wiener med. Wochenschrift," 1886, p. 793.

† "Deutsche Zeitschr. f. Chirurgie," vol. xx, p. 453.

‡ Langenbeck's "Archiv," vol. xxxvi, 3, p. 680.

afterward of the whole bladder; symptoms of stricture. The necessary treatment was ordered and the bladder washed for eight months. No material benefit. In the course of treatment, about seven months ago, a marked chill of ten minutes' duration set in, with pains in the right lumbar region. Since that day there has been a large amount of pus in the urine, sometimes the sixth of the whole quantity. Soon a good deal of albumin was found, and, the diagnosis being made as pyelonephritis ascendens, the prognosis, of course, was very doubtful. In the beginning of February the patient came to my office. I found stricture of the pendulous and membranous portion of the urethra, large prostate, painful on pressure, and urine with a large amount of pus and mucus, very few cells, resembling those of the pelvis of the kidney, prostate corpuscles. No pain in urinating, no blood, no sudden stop in the flow of urine. The patient being opposed to any direct surgical interference, I had to content myself with widening his strictures by the introduction of steel sounds and with internal treatment, keeping in view internal urethrotomy and drainage of the bladder, or, as soon as it could be diagnosticated whether both kidneys were affected or only one, nephrotomy. A careful examination of the bladder revealed nothing at all, the same result the other colleagues had had before me. At that time I received Leiter's cystoscope, and at once resolved to look into this bladder. Without any difficulty I saw there two dark-brown, even stones, of the size of a hazelnut, lying in the groove behind the swollen prostate. With the beak of the instrument I succeeded in throwing them out into the fundus, where I could easily percuss them, finding them very hard. A large, snow-white piece of coagulated mucus was lying at their side, its slender, dendritic ramifications floating in the fluid. The mucous membrane of the bladder was more or less healthy. Only here and

there I saw a purple-colored spot with an adherent flake of mucus. I further discovered the mouth of the ureters without any difficulty, and could plainly perceive how whirls originated there that permanently set in motion the whole injected fluid. I was not yet able to make out whether the urine in entering the bladder was clear or muddy. But as the injected water, at first perfectly transparent, became opaque in a few minutes, I could conclude that the pus most probably descended from one kidney or both. Thus far the patient, who feels otherwise very well, has not consented to the proposed removal of the stones. Meanwhile I have had the pleasure of demonstrating them to Dr. A. G. Gerster, who also saw them very distinctly.

Returning to our subject, lastly, let us see in which way the treatment of *tumors of the bladder*—this favorite child of modern surgery of the bladder—has been benefited by cystoscopy. One word will say *how* we did and shall advance here, too, “early diagnosis.” If the cystoscope had brought nothing else than this, it would be enough. What prevents our patients on whom we have operated for tumor of the bladder from enjoying the benefit of the removal of the new growth for many years still, to-day, where technique and after-treatment have been so greatly improved, is not the operation itself, epicystotomy or median section. It is pyelonephritis, produced by the long-continued disease of the bladder. As long as we drain the bladder after the operation (by Trendelenburg’s T-tube in open-wound treatment, or a permanent catheter after having closed the wound of the bladder by suture), we also drain the pelvis of the kidney. Every drop of urine that enters the bladder from above will leave it immediately by way of the tubes. Reflux is impossible. Of course, the uncomplicated pyelitis will get better under this treatment, as well as the chronic catarrh of the bladder; both even may get cured by prolonged

drainage. But, unfortunately, nephritis is so often combined with pyelitis. Pyelonephritis can *only improve*. A "*restitutio ad integrum*" by draining the bladder would be an exceptional case. To cure it we should have to add nephrotomy, and even that sometimes without permanent success, or, if the diagnosis of a unilateral affection has been made, nephrectomy.

I, too, had to have this experience in the case of a patient, fifty-three years of age, in whom I extirpated a villous growth (papilloma) by epicystotomy in October, 1886. It had the size of an apple, and had troubled the patient for several years. He was entirely relieved of all his troubles, was well last summer and able to work, and enjoyed his life. He could easily retain the urine for three hours and more, and passed the water in a strong spurt. But by and by the quantity of albumin in the urine, that had never fully disappeared, increased, the old nephritis that had slumbered for several months made progress, without a recurrence of the chills that had frequently set in before the operation, caused by the cystic pyelitis. A few weeks ago the urine contained about one third of its volume of albumin. The patient is now unable to work, and will certainly die in a short time. If he could have been examined with the cystoscope two years ago, at the time of the first spontaneous hæmaturia, before he came under my attendance, and if with the cystoscope the diagnosis had *then* been made and the small new growth removed, the patient would probably now be cured.

That cystoscopy will enable us to diagnosticate tumors of the bladder *early* is certainly a progress that can not be overestimated. It will now become the duty of the attending physician to take care that the cystoscope is introduced into the bladder of a patient who is attacked with hæmaturia of short duration without any warning. He will no

longer satisfy himself and the patient with the diagnosis so much in favor—"hæmorrhoids of the bladder."

Of course, we shall try to find out the size, location, and manner of insertion, whether the tumor has a pedicle or a broad base. V. Bergmann was enabled, in performing epicystotomy for tumor, not to incise the site of insertion, and consequently to avoid a serious hæmorrhage, having, with Dr. Nitze, localized the growth before by endoscopical examination. Nitze reports in his essay sixteen cases of tumor of the bladder (Nitze 8, Schustler 7, Nicoladoni 1) in which the diagnosis had been made or confirmed with the cystoscope. As Dr. Nitze writes me last week, he has diagnosed seven more of them with his instrument since his last publication. Six of them were operated on. The diagnosis in regard to size, localization, etc., was sustained by the operations in every particular.

But the cystoscope will often have to reveal the secret hidden in the bladder, not only in recent cases, but also in an advanced stage, of tumor, when the other diagnostic means have failed. It is well known that often in a case of tumor of the bladder nothing can be found in the urine except blood and the evidences of catarrh, that examination with sounds and the combined rectal palpation give no positive result, and that we do not always succeed in tearing off small pieces for microscopical examination. Besides, such particles have caused grave errors when examined. Cases of Czerny's, Küster's, and Tuchmann's demonstrate this possibility.

It need not be mentioned that we shall not depend upon the result of cystoscopy alone. In some instances it will undoubtedly be very difficult to make with its help the differential diagnosis between a new growth that covers a large spot and chronic circumscribed catarrh of the bladder. We rather ought to compare the result gained by

ocular inspection of the vesical cavity with those achieved by other methods, judge by all, and then only operate.

Let us see finally, Mr. Chairman and gentlemen, how much the *treatment* of diseases of the bladder has profited by the more exact diagnoses made with the cystoscope. A very great deal! The catarrh in its variations will undergo different treatment; ulcerations of the wall of the bladder will be attacked with the knife, those of tubercular character, according to Schatz, radically extirpated, the wall of the bladder included. Diverticula could be washed with catheters of a special curvature, as Nitze proposes, but has not yet tried. Their presence would require a very careful distension of the bladder for the suprapubic incision. We know that rupture of the bladder especially takes place at a diverticulum with thin walls. Foreign bodies can not only be diagnosticated, as mentioned above, but plainly localized, and therefore removed with absolute certainty by one of the methods. In regard to lithiasis, cystoscopy will again intensify the international discussion, going on for about five years, on "which is the best method of operating"—whether by epicystotomy or median section, or by lithotripsy or litholapaxy. The main reproach to litholapaxy, the frequent and early recurrence of the old trouble, has lost its foundation, as we are now enabled to inspect the interior of the bladder and to crush and evacuate as long as there are fragments to be seen. When this is accomplished the patient will be cured in the simplest and quickest manner. On account of this possibility, Nitze predicts for the crushing method a due and firm place among the different operations for stone in the bladder. How far this will be realized we must wait to see. It has been mentioned above that encysted stones will be seen. The possibility of their removal is thereby materially increased.

The vital statistics of tumor of the bladder will be

greatly improved by the early diagnosis. To remove small benign polypi, Nitze proposes not to incise the bladder, but to crush the growths, when localized, with a long forceps, introduced *per urethram*, and then to evacuate them. We can only agree with him when he says that a strong and healthy patient who passes blood, pure or mixed with urine, for a few days will more readily submit to cystoscopy and tearing or crushing of the tumor than to a more serious operation. Whether that will be realized, we again must wait to see. At all events, it seems to be easier to destroy a polypus floating in the fluid and having an insertion known to us than to perform median section and grasp the growth within the empty organ by the aid of digital exploration, as recommended by Thompson. Large and infiltrating neoplasms will belong, as formerly, to the suprapubic incision.

It is evident, Mr. Chairman, that the advance in the diagnosis and treatment of diseases of the bladder, as described by me, is not so easily, and especially not so quickly, made. No, cystoscopy not only wants to be thoroughly studied in regard to technique, but has to be investigated yet in many respects. "Now, being enabled to inspect the morbid bladder with the help of brilliant illumination in the living subject, the characteristic pictures of different pathological alterations will have to be studied in the same manner as it was necessary to do and was done in regard to the larynx and the eye when the laryngoscope and the ophthalmoscope were invented." "When the cystoscopy of to-day," says Nitze, "is of the same age as, for instance, laryngoscopy, that has been diligently and enthusiastically cultivated and improved by generations, then it will have, beyond any doubt, an equal, perhaps even a greater, surety in the diagnosis of pathological conditions of the bladder."

Although I am not able to-day, Mr. Chairman and gentle-

men, to let you inspect the diseased bladder of a living subject, I sincerely hope that the instrument that allows us to do this in such a simple and handy way is sufficiently interesting to justify me in its demonstration and a short discussion of the new branch of surgical diagnostics created by it—cystoscopy.

